2: Bernardi E, M-4 (no date) 1955 FL12 Masai FL12

cattle" and "red bulls". HOLLIS,[34] recorded two subdivisions of the Uasin Gishu, "the black striped cattle", and "the red striped cattle", which were, very probably, no other thing than the moieties.

The Masai *clans*, *ol gilata*, pl. *il gilata* or *en gishomi*, pl. *in gishomi*, are patrilineal and exogamous. Generally, they do not seem to be totemic. However, HOBLEY,[35] and the author of *MS.* No. 48 have recorded the names of a few clan totem. FOX,[36] refers also to the association of snakes with some clans.

The true exogamic unit of the Masai seems to be any individed unit, either clan or branch of the clan. A man may be adopted into another clan then his original one. The same provision applies even to an alien (Kikuyu, Dorobo). The adoptee, however, never attains the same social status as a full member of the clan. He is free to leave at any time, provided he returns whatever he was presented by his patrons, such as cattle or any other valuable.

The relationship between clans and their territorial distribution is not very clear. Analysis would suggest that in the past, clans were territorially separated. At present, there is still a tendency for members of the same clan to live close by to one another and occupy neighbouring encampments. Some sections are almost made up by members of a single clan. Thus, the *Molelian* clan is predominant in Kapiti section; the *Atayok* clan is predominant in Dalalakotok section. Such facts, however, seem to be the exception. Usually clans are represented at a time in many different sections "There is no rule", writes HOBLEY,[37] "governing the distribution of the various *gilat* (clans); often members of as many as three *gilat* will be found in one *moru engang* (elders' village) or a *moran manyat* (warriors' village)".

Water and cattle are generally clan possession. When new water sources are discovered, they are claimed on behalf of the clan. All clan members who live in the neighbourhood are entitled to make use of them. A foreigner may also be allowed to water his cattle there. If disputes arise, they are settled by the council of clan-members on the spot. As a matter of fact, these water sources are the centre of ordinary social life, as FOSBROOKE[38] writes: "The

[34] HOLLIS, *l. c.*, p. 436.
[35] HOBLEY, l. c., p. 126.
[36] FOX, l. c., p. 458.
[37] HOBLEY, *Eastern Uganda. An ethnological Survey*, London 1902, p. 122.
[38] FOSBROOKE, l. c., p. 42.

2: Bernardi E, M-4 (no date) 1955 FL12 Masai FL12

614 623 312 423 clansmen frequently meet on the water, and other matters — marriage, debts, etc. — come up for settlement before the tribunal". Clan ownership does not exclude individual ownership, which is integrated by the former as a sort of higher supervision. The point is that no clan property must be passed over to other clans without the owning clan's approval. HOBLEY,[29] states that cattle used to be marked by a clan brand showing clan-possession, and sometimes by a brand of the individual owner.

614 672 682 The corporate bond arising from clan relationship is confirmed by cases of murder compensation. Even if a murderer is a wealthy man, and might pay all the compensation out of his own stock, "the other branches of the clan would still contribute and they would pay their share". However, "if a Masai kills a member of his own branch of the *gilat* he pays compensation himself, and the other branches do not contribute".[30] LEAKEY, on the other hand, was told by his informants that no compensation is expected when a man kills a member of his own branch. They say: "what would be the use of taking a fine from one's own sub-clan?"[31] HOBLEY reports further that "each branch of the *gilat* to whom the murdered man belongs, receives a share of the compensation: 2-3rds to the murdered's father", and the rest is distributed among the other elders of the clan.[32] This is also confirmed by the notes of MAGUIRE on the penal code of the Masai.[33]

614 One should note that the corporate bond formed by clan relationship is of a particularist nature. It ties members to their own clan in opposition to other clans within the same tribe.

* * *

648 649 175 The many efforts of the Administration to identify a native political institution for local government make a very interesting piece of etnographical history. First in Kenya, and also, after 1918, in Tanganyika, one *laibon* was recognised as the Paramount Chief of the Masai. In Kenya such an office was abolished in 1918, while a graded system of councils was introduced: a Central Masai Council, 14 Native Councils and local Headmen. They acted as tribunals,

[29] HOBLEY, *Ethnology of A-Kamba*, p. 128.

[30] HOBLEY, l. c., p. 123; FOSBROOKE, l. c., pp. 43 s.

[31] LEAKEY, *Some Notes on the Masai of Kenya Colony*, in *J. R. A. I.*, 60, 1930, p. 309.

[32] HOBLEY, l. c.

[33] MAGUIRE, *The Masai Penal Code*, in *J. A. S.*, 38, 1938, pp. 13 ss.

4: Sandford

FL12 Masai FL12

*648
102
131
133
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P. 38-A	P. 38-B
P. 38-C	P. 38-D

[Chart of positions of map facing p. 38]

4: Sandford G-4, 5 (1918) 1919 FL12 Masai FL12

[P.38-A]

#148
102
131
133
312

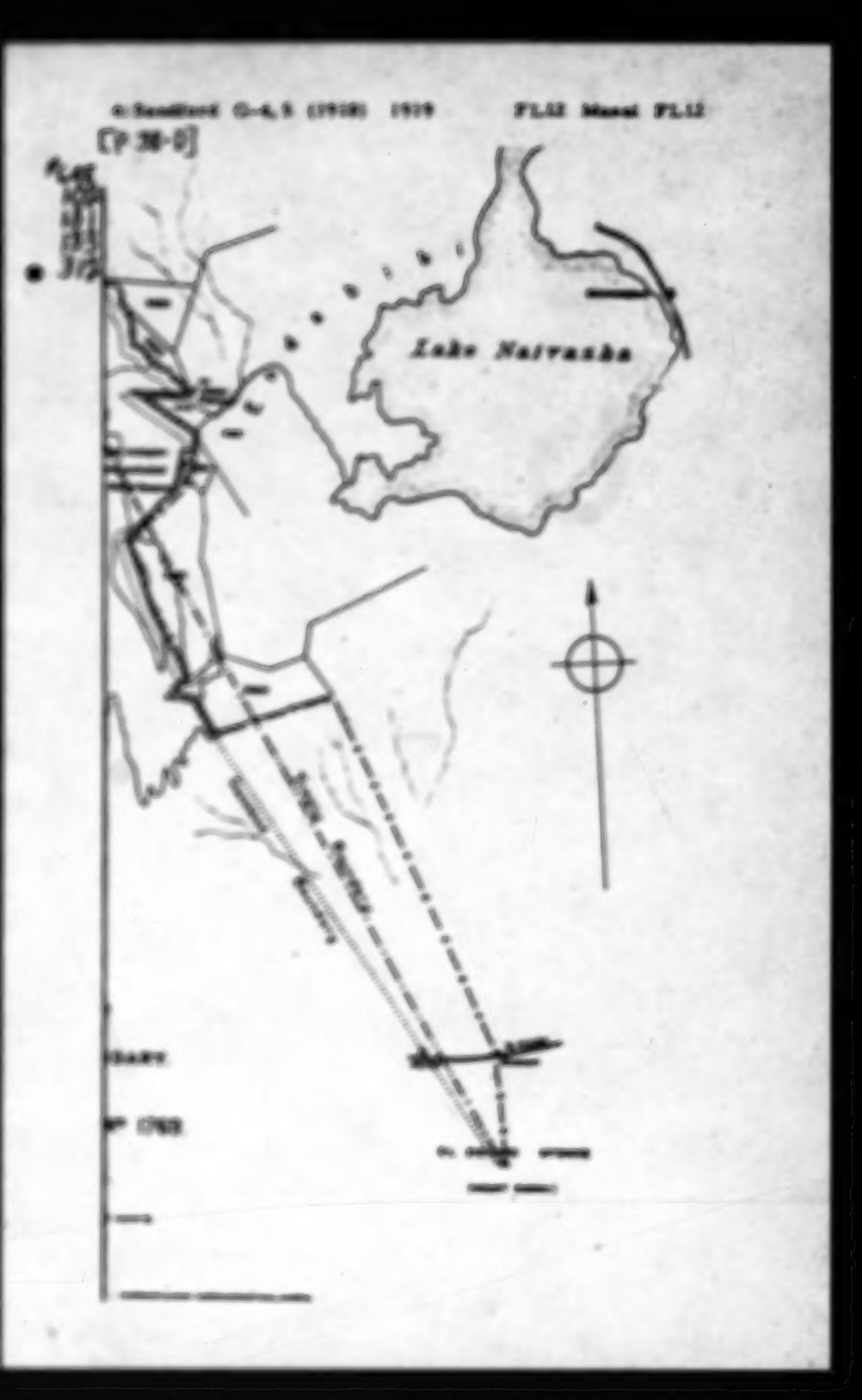
[P. 58-B]

Sketch showing the

MASAI RESERVE BOUNDARY

from

MOUNT SUSWA TO FARM 8TH (TSS)


Lake Nairasha

Section IV. THE WATER SUPPLY.

Tour by Mr. McClure and Captain Hamilton. Tour by Messrs. Boggs and Hollis. Tour by Mr. Watts. Government liability to improve water supply. Meeting at Nakuru. The Engare Nyiro area. The Kaputiei area—Sir Percy Girouard's proposal. Mr. Corbyn's work. Mr. Blain's proposals. The engagement of Mr. Watts. Necessary improvements. The construction of the Lemek Dams. Recommendations by Messrs. Watts and Hemsted. The completion of the Lemek Valley Dams. The Sisiwet Dam. Further proposals by Messrs. Watts and Hemsted. Liability of the Masai to provide funds. The Ngare Goi Dams. Work in the Kedong Valley—The Wekiri Dam. The Pongwa Dam. El Balwa and Marmonet Dams. Contributions by the Masai. Damage to Dams at Lemek and Ngare Goi. Shortage of funds. The completion of the Ngare Goi Dams. Repairs to Lemek Dams. Mr. Watts' final report. Mr. Hemsted's proposals. Authority to repair damaged Dams. General recommendations. Drainage of swamps on Wekiri River. Dams in the Rift Valley.

Towards the end of the year 1908, a tour of inspection was made by Mr. McClure, the Acting District Commissioner, Ngong, and Captain Hamilton, the Assistant District Commissioner, Sotik, in the country lying west of the Northern Uaso Nyiro, more especially of the areas known as Ozora and the Loita Plains and Hills. This inspection was conducted with a view to ascertaining the potential value of the area as a place for European settlement. The opinion of these officers was that the land near Sotik was, on the whole, unsuited to such settlement, because, although portions of the land could be converted into farms, the holdings would be so disconnected by reason of lack of permanent water, that proper supervision of the area would be impracticable. The permanent streams were so far apart as to preclude any possibility of allotting land on a systematic plan, but they suggested that it was admirably suited to a nomadic and pastoral tribe, such as the Masai.

A portion of the west bank of the Uaso Nyiro, and the Lemek Valley, had already been allotted to Europeans, but some 2,300* square miles of land were left available for European or native settlement. Of this area, 1,300* square miles might be described as waterless, *i.e.*, without permanent water of any description. After a moderately rainy season there would be sufficient water for such a tribe as the Masai. The year 1908 had been unusually dry, but a fair amount of standing water was found in dry river beds.

Large numbers of Purko Masai had recently migrated from Ngatet to Ozora, the Rotonik and Moripo Plains, their numbers being estimated at 2,000 men, women, and children, with 20,000 head of cattle, and the grazing grounds in Ozora were said by the Masai to be exceptionally good. The value of the magnificent grazing in the Loita Plains was greatly reduced by the absence of springs or other permanent water, but this country had previously been occupied by three clans of Masai—the Loita, L'Ologwuk, and Ilumat.

These officers estimated that the area could easily provide dry and wet weather grazing for 100,000 head of cattle, provided the water difficulty was overcome, and reported that the ravages of fly were confined to the country near the Anglo-German border.

The country was next visited by Messrs. Boggs and Hollis, who toured, from the 10th of March until the 20th of April, 1909, the area lying between the Uaso Nyiro and the Mara River with a view to ascertaining the value of the region for occupation by the Masai then located in Laikipia, paying special attention to the water proposition. They reported that the two large rivers, the Uaso Nyiro and Mara, were 35 miles apart at their nearest points, that there were several minor rivers of no great length, and that water was obtainable by digging at various points. Some of the best water on the Uaso Nyiro was already in the occupation of white colonists, and a considerable portion on El Molili was also marked off for alienation. Under the observed conditions, Mr. Boggs was unable to recommend the removal of the Northern Masai into the region, and he suggested the investigation of the potentialities of the Mau uplands.

* It is possible that these areas were over-estimated owing to the absence of an accurate survey.

*648
312

Mr. Hollis was of opinion that half of the area of 2,500 square miles was useless for cattle during the greater part of the year, owing to scarcity of water, while in one-eighth a fly was found to destroy which caused great destruction to cattle. He was, however, convinced that, if it were possible to irrigate the waterless parts or to dam up some of the springs and water-courses, the greater part of the Lotta country would become an excellent grazing area. He suggested that a sum of £1,000 be set aside for the purpose of watering the country, and that an engineer be detailed to inspect and report on the area. At the same time, he pointed out that money spent on such inspection would not be thrown away, even if the Maori were not moved from Lochiels, as any improvement of the area in question would mean that more land became available for white settlement.

Dam at Mr. Wells.

The district was accordingly visited by Mr. C. E. Wells, Commissioner of Public Works, who left Waiouru on June 26th, 1918, and spent a month investigating the possibility of providing a sufficient water supply for the stock which might be transferred from the Northern Reserve. From an examination of the geological properties of the area, Mr. Wells concluded that the conditions obtaining therein, except in the country between Lake Rotoaira and the Upper Rangitikei, were similar to those previously dealt with by him in India, and he therefore recommended that similar methods could be used. These were:—

(1) The sinking of wells;

(2) The damming of rivers by permanent earthen, masonry, or concrete dams, and providing a waste weir round the dams, being above to the dam themselves;

(3) Making small masonry dams across rivers and allowing the flood water to flow over them; and

(4) The construction of small dams with trees, boulders, and clay, and allowing water to percolate through in ordinary times and to flow over the top in the floods.

He considered that no improvements were necessary on the Main River, or between Lake Rotoaira and the left bank of the Upper Rapis over the Main, and by way of Pawhetiki, as the country was already well watered, and he recommended the following constructions:—

(a) For the northern portion of the Lotta Plains, two canals 15 miles apart and 15 miles long, and carrying 200,000 gallons per hour.

(b) For the southern portion of the Lotta Plains, a dam composed of trees, boulders, and clay in the hills above the Okahuri River, and a furrow 10 miles long.

(c) For the Lotta Hills, dams to form artificial reservoirs; these would be simple of construction, as gorges and rocky ridges of good shortage were found in the hills.

(d) From these hills to the Common boundary, and in Otara, a combination of the well and dam system.

In the plain below Raiwaru spring and in the Lower Valley more investigation was necessary.

He considered that a sum of £4,000 would have to be expended on these works before the whole area could be utilised for grazing purposes, and he asked that provision to the extent of £2,000 be made in the estimates for 1918-1911 to make a commencement. This sum was inserted in the Estimates but was disallowed by the Secretary of State.

Commencement Liability to supply water-power.

During the negotiations which preceded the Maori move, Sir Percy Cleveland informed the Maori Chiefs that he would be willing to assist the tribe in sinking wells and improving the water supply if it were found that the water in the proposed Northern Reserve were insufficient for their requirements. No request, however, until the removal of the Maori to the Northern Reserve [illegible] the approval of the Secretary of State on the 20th of May, 1911.

GAS 312

In August, 1911, Mr. Cartwright was sent to construct roads as proposed by Mr. Wells from the Coco Bytes to the Lotis Plains. £400 was available for the work and a sum of £2,000 had been sanctioned for the improvement of the water supply in the extended Pontiana Reserve. The project seemed to be one which would involve greater expenditure than that originally anticipated, owing to the configuration of the country; the construction was therefore delayed, while the best means of improving the water supply were re-considered and Mr. Cartwright recalled.

A meeting was held at Kokora on the 18th of September between the Provincial Commissioner (Mr. Abercrombie), the Director of Public Works (Mr. McGregor Ross), and Executive Engineer (Mr. C. H. Cromwell). In addition to the unexpected difficulty and cost of construction of the roads, it appeared doubtful if the water from the Coco Bytes was sufficient to provide water for any extended scheme of distribution on the Lotis Plains. The configuration of the country was unsuitable and the water difficult of access. It was therefore urged that further investigations should be made before the Head (whose sanctioned agreement had received a check) were finally moved into the area.

On the 20th of October a report was received from Messrs. MacDonald and Atkinson in respect of the Cliffland country, from which they had just returned. The area was said to contain one million acres of the finest grazing land in the Protectorate and to be well watered. Some investigation was, however, necessary in order to locate all the available sources.

On the 14th of November, Mr. E. D. Bowyer reported that the work and of Y-Engineer, extending into the Gudanga Creek, was well advanced by permanent streams and would need more work if necessary.

Before he went on leave in February, 1912, Sir Percy Cleveland suggested that water might be supplied from the Coco Bytes by race for distribution in the country within seven miles of the river. Conditions of site might be found which would allow of water being lifted for a portion of the distance by race and delivered for the remainder by gravitation.

The banks of the Coco Bytes were examined by Mr. Cromwell in July, 1912. He found no suitable places for the installation, but several places were located on the Lotis Plains which would be reached later by means of inexpensive dams. In particular he mentioned the valley of the River Kokora as being eminently suitable. No provision was made for the installation of mains.

It had originally been thought that the provision of facilities for watering cattle in the Coco Bytes district would be the most urgent work required in the extended Pontiana Game Reserve, but it was soon found that other matters demanded prior attention. In the first place, it was evident that, owing to the very large herds of cattle using the roads from the Bare towards the Bare River, it was necessary to protect the water holes on route, particularly in the Lotis Valley.

On July 20th the Provincial Commissioner, Kokora, had asked for sanction to employ a European overseer, then working on the cattle route through the Bare Forest, in constructing dams first on the Monument and then on the River Kokora or other streams both in the Lotis Plains. Fourteen had been given and Mr. Cartwright reached the Lotis Valley at the end of August. As the work in the valley was very urgent, he attempted to dam some small streams on the North side of the valley but found the ground to be exceedingly porous. There were 2nd well defined springs in the neighbourhood but their capacity was small. He eventually proceeded to work on dams on the Lotis Plains.

On the 21st December, 1912, Executive Engineer Mr. Blake submitted a scheme for storing water in four tanks in order to provide water during the dry season on the Lotis Plains. The use of tanking that the volcanic nature of the soil and the faults in the underlying strata make the success of earthen dams very uncertain. The high cost of transportation about six months in the dry season would mean a serious loss of water in the case of earth dams with a large exposed surface and he suggested reinforced concrete reservoirs or iron tanks as an alternative.

[illegible] were preferable on account of the lower initial cost and the greater facility of moving them to the most suitable places as they became known by experience. The cost of a unit of 5,000 gallons per month, which would be sufficient for 100 head of cattle, was estimated at Rs. 1,000. It was suggested that 20 such units should be provided as an experiment, and funds amounting to £4,000 were asked for for this purpose. Certain springs in the Kadung Valley were suggested for treatment by this method, but information was lacking as to the permanency of the various sources and the number of cattle which would be placed in the neighbourhood if the water were made available by this method. No action was therefore taken on the suggestion.

At the beginning of the year 1913, £500 had been spent by the Provincial Commissioner, Kalyadan, in making small dams in various parts of the extended Northern Reserve, but the £5,000 sanctioned in September, 1911, for use on this work had been practically untouched.

The Supervising Engineer's visit.

In January, 1913, the Chief Secretary recommended the engagement of a competent engineer to make careful surveys of the area between the Ulan River and the Mara River, to take observations and to superintend the works decided on. The draft Estimates for 1913-14 contained provision for £4,000 to be expended on buildings and works in the Northern Rural Reserve, and it was considered undesirable to divide this sum under specific sub-heads until the requirements of the water supply were better known. The Governor considered that it was of the utmost importance that the reserve should be ready for occupation by the time the Rural move (then in progress) was completed, and gave orders that steps be taken without delay to effect further progress with the works. The dams already constructed had not been successfully repaired as yet, and it considered that the work could not be delayed until the money set aside for the project in 1913-14 became available. He proposed to engage the services of Mr. Wyatt, formerly Commissioner of Public Works, and authorised the Secretary of State's approval to this appointment on the 28th of January.

Surveys and Estimates.

The Rural moved from Lathyan had encamped a preliminary for the country east of the Mara River and had named the river. The dams constructed by Mr. Cartwright had reduced for the existing requirements of the Rural near the Lemek Valley, but some extensive works would be necessary in the future and it was suggested that Mr. Wyatt should examine this part of the district himself, only with a view to recommending waterworks on a larger and more permanent scale.

The rains had been an abundant since July, 1912, that the grazing in the Mara River country was all that could be desired and greatly in excess of the actual cattle requirements. The Provincial Commissioner, Kalyadan, suggested that consideration of that area be postponed until March, 1913, which would be the first occasion on which it might be inspected in a period of drought.

The Inspection of the Lemek Dam

Mr. Wyatt toured the Ol- and Trans-Mara areas in March, 1913, and left Nairobi on the 17th of April to inspect and redesign one of the dams constructed by Mr. Cartwright in the Lemek Valley.

Inspection during the Rains and Proposals.

On the occasion of the Deputy Resident's tour in the Rural Reserve in July, 1913, Mr. Wyatt submitted an interim report on the work he was doing in the Lemek Valley. The general project was the damming of a stream which had been left unfinished by Mr. Cartwright, and raising and lengthening of Mr. Cartwright's dams, which had been successfully destroyed by the floods of rivers in May, and the construction of a dam below those made by Mr. Cartwright and on the same stream. The first dam was to be forty feet high, and built to a narrow deep section to a stream above the other two dams. A drain was to be cut which would act as a feeder from this large dam to the smaller dams down the valley. Mr. Wyatt mentioned that the [illegible] of the big rains rapidly, in fact, since the middle of June at the outbreak of the rainy season, and as from a permanent stream, was leading to keep the lower dams full throughout the year.

By the 23rd of July, the big dam was 30 feet high, with 24 feet of water behind it. The lake would eventually be 400 feet long and 130 feet wide, and would contain 600,000 cubic feet of water. A waste weir was provided to remove surplus water in the rains. The dam was being composed of stone and earth, and the estimated cost was £300.

The two lower dams were to cost £200 each, and were constructed each to contain 200,000 cubic feet of water. They were situated so as to be full throughout the year by one small stream.

Mr. Watts estimated that the water in the dams would suffice for stock grazing over an area of 100 square miles near the site, and hoped to complete the works during October, 1913.

In September, Mr. Watts discussed the general question of the water supply with Mr. Hammond, and joint recommendations were submitted by them officers in October. The report stated that the whole country from the Upper Kyles and its tributaries to the Bora River was chiefly grazed whenever water was available, and that in the area between the Upper Kyles and Kipsite the country near water was grazed and the remainder devastated by grass fires. The only good grazing remaining was to be found on the slopes of the Bor, on the hills near Kamasia towards the Angle-Glossum border, and in parts of the Trans-Bora country. It was necessary, therefore, to improve the supply between Ngong and the Uasin Kishu and on the plateau above the Lumbwa Encampment in the Trans-Bora. Such improvements would involve a vast area, which could only be utilized for a few weeks during each monsoon, available for grazing all the year round.

Mr. Watts explained that the estimate of £1,200, made in 1909 was made on account of 60,000 head of cattle only, and that the question of water supply had been considerably enlarged by the present estimate that 300,000 head of cattle were to be provided for. Little difficulty had been experienced during the year 1913, as the rainfall had been above the normal, and many of the natural sources of water had held out longer than usual.

As a major scheme, Mr. Hammond suggested that the water should be brought by a canal or pipes from the River Nyando on to the top of the Mau spurs and into the valley below Kisumu Station. Mr. Watts estimated the cost of this project at £14,000 or £20,000, and, in the event of this work being considered too expensive, he suggested that this area might be improved by the construction of dams at eight places where water in holes was known to exist.

In the Trans-Bora area three or four dams were necessary on the plateau.

Mr. Watts asked for the insertion of £7,000 in the draft estimates for 1914-15, which sum would go far towards the construction of the dams of the suggested plans. Work on the grazing areas in the immediate adjacent forwards, the hot springs at Ogoro (Bora) and the Uasin Kishu country might be deferred until the year 1914-15. These areas were not being used for lack of water, and the country was being devastated by grass fires.

Work on the Lumbwa Valley dams was completed in October, 1913. The big dam was 42 feet high in the highest part and 170 feet long at the top. It would contain 10,000 head of cattle watered at it. The smaller dams were also useful and in November, when, as a result of heavy rain, water accumulated in them, but it was not until the end of December that they were filled to full level.

The completion of the work in the Lumbwa Valley, Mr. Watts proceeded to the Kamasia, situated 10 or 12 miles to the south-east on the edge of the Lumbwa Plains, and started work in the middle of November. There were only three or four small springs at Kamasia, so it was decided to [illegible] dams, one 200 feet long and 17 feet high in the highest part was commenced, the dam being lined to front with stone pitching, specially [illegible]. By the middle of December it was high enough to store [illegible] gallons of water, and a temporary waste weir was made to carry off the water.

Water collected in the dam in December and continued to it during the three following months though some 10,000 head of cattle watered there daily.

During the year 1913-14, £3,000 was spent in making these dams in Lemek Valley and Barlessat, and during the 13 months beginning on the 1st of March, 1913, Mr. Watts spent eight months in construction work.

Further proposals by Messrs. Watts and Hemsted.

In January, 1914, Messrs. Watts and Hemsted submitted proposals for the continuation of work on the improvement of the water supply of the reserve. They recommended

(1) The completion of the Barlessat dam.

(2) The provision of steel drinking troughs at the Keiyaki spring, a permanent spring, situated some 12 miles south of Mara Post (Kegiroube).

(3) The construction of one or more dams in the Trans-Mara country between the Mara and Mogor River.

(4) The construction of a dam in the Kedong Valley.

(5) The provision of pumps and drinking troughs at all dams and the erection of fences to protect the sources behind them.

(6) The investigation of a project for diverting the Siyabei River in its upper courses to supplement the flow of the Ondiet and Poeyin Rivers, and thereafter for watering the country west of Mount Suswa, known as Lolendwa; and

(7) The construction of a dam in the Lolieka Plains in the upper Lolia country.

The Lolia Plains were described as one of the least valuable areas in the reserve, considered as a region for the permanent support of large numbers of live-stock; the grazing in the plains was frequently exhausted before the natural supplies of water failed. It was therefore thought that the completion of the first, second, and last of the projects recommended would suffice as development in that area.

Question of the Masai to Native Councils. [illegible]

In June, 1913, Sir Henry Belfield had explained to the Masai that, when the Government had afforded certain practical examples of the benefits which would accrue from the conservation and distribution of water, the tribe would be expected themselves to defray the cost of such additional works as they might require. He therefore considered that it was open to question whether all the proposed works should be undertaken at Government expense, and that it would be sufficient to proceed with them so far as the provision for 1914-15 became available. Where these funds had been utilized, he advocated further consideration of what additional works should be taken in hand and of the method of meeting the cost.

The Lol Dam.

After touring the Trans-Mara area with Mr. Hemsted in March, Mr. Watts returned to Barlessat and continued the construction of the dam. Early in April he visited Ngori Gori, on the border of the Lolia Plain and close to a branch of the Chepalungu Forest. En route he repaired one of Mr. Ostrehan's dams near Lemo Hill. From the 8th to the 26th of April he worked at two dams at Ngori Gori, completing them for a cost of £247. One dam was 300 feet long and 8 feet high; the other was 400 feet long and 20 feet high.

On April 28th he reached the Poeyin River and laid out work for a new dam at Nidubele. He estimated that the dams he had already constructed would protect 225 square miles of country and provide drinking water all the year round for 24,120 head of cattle or some 120,000 sheep. The works were much appreciated by the Masai in the neighbourhood, who had thrown out suggestions for further improvements required.

Work on Kedong Valley.

On June 12th, 1914, Mr. Watts left the Poeyin dam uncompleted and proceeded to the Kedong Valley to investigate the possibility of constructing a dam on the Kedong River for the use of the Masai.

The Kedong River is one of mountain flow. In May, 1913 and March, 1911, the Greater Kedong was not even flowing as far as its junction with the lower Kedong. In January, 1913, the combined streams disappeared a quarter of a mile below the house belonging to Ruyguie Ruyguie and Captain Riddell, and

648 *
312

it was unusual for the water to reach that house after August in any year. A site for a dam was chosen which was believed to be in the Masai Reserve, but was, after the work had been started, found to be on Marquis Hornyold's land. Mr. Watts then suggested the completion of his dam at this place and the construction of water pipes from the reservoir to the Masai Reserve. This proposal would entail the acquisition from Marquis Hornyold of the land used for the dam spread, pipe line and inspection path, but was, he considered, the only method by which water could be supplied to the Masai in the Kedong Valley. This course was, however, open to certain objections and Mr. Watts was instructed to discontinue his work there, and employ all his labour in draining swamps on Mr. Bowker's land in the Kedong Valley. The Governor was not prepared to consider the question of the expropriation of land from Marquis Hornyold until it had been demonstrated that the use of the area for the purpose proposed was essential and not merely desirable.

In the event of proposals for the acquisition of this land falling through, Mr. Watts suggested that water might be provided by the construction of a smaller temporary dam at this spot while a permanent dam was constructed lower down the Valley in the Masai Reserve.

From July to November, 1914, Mr. Watts worked on a drainage scheme on European farms in the Kedong Valley. Water was unobtainable at these places in the Masai Reserve where the construction of the most urgent works was contemplated, and he was unable to work on them. His expenses during this period were not charged against the Masai Water Supply Vote.

In July Messrs. Welsh and Morgan continued work at the Prayin dam under instructions from Mr. Watts, but left the work unfinished owing to the commencement of their cases at the outbreak of war.

On the 20th of November, Mr. Watts left the Kedong for the Weiboi River and commenced buildings close on the 22nd. The site of the dam was on the eastern slopes of the Mau Escarpment, south of Lake Naivasha and west of Mount Suswa. The dam was made 300 feet long and 30 feet high and contained 1,320,000 cubic feet of water. This dam was finished on the 9th of April, 1915. The Weiboi Dam.

Work was resumed on the Prayin dam in April, 1915, and the dam was completed on the 21st of May. This dam was situated in a valley at the top of the Mau Range on the west side of the junction of Il Moiki and Lebrokwa at an altitude of 8,000 feet. It was 600 feet long and 16 feet high and contained 960,000 cubic feet of water. The Prayin Dam.

Mr. Watts then constructed a dam on the east side of Lebrokwa facing Mount Suswa at Ol Motiyo and afterwards one at Marmanet. Ol Motiyo and Marmanet Dams.

In March, 1915, the Masai of the Kaboroktyo division contributed a sum of Rs. 10,430 to be utilized in improving the water supply of their country and the total contributions from the Masai amounted to Rs. 14,430 in June. Contribution taken by the Masai.

A certain amount of damage had been caused to the dams at Lemek and Ngori Gisi by the rains in April, 1915, and Mr. Watts proposed to repair them in August. For military reasons his visit had to be postponed and he proceeded to the Nankwiek on the 6th of August to improve the springs on the top of the Mau and to clean out the bed of the Weiboi River. During September he was working on the Il Moiki section of the Mau Range. Damage to dams at Lemek and Ngori Gisi.

Funds for the improvement of the Masai water supply ran out in September, but the Governor approved the utilization of money accruing from rents and trading cess in the Masai Reserves in order that the necessary repairs to the Lemek and Ngori Gisi dams might be carried out. A certain amount of money was also transferred from the Masai Suspense Account for the completion of these dams. With such funds it was proposed to complete the dams at Ngori Gisi, the repairs at Lemek, and the opening up of springs at the sources of the Nankwiek, Weiboi and Prayin streams. After these works had been completed it was decided that the continuation of Mr. Watts' services depended on whether the Masai subscribed further funds for additional works of conservation. Absence of funds.

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The completion of the Ngori Gori Dams.

During November and the first half of December, Mr. Watts completed the dams at Ngori Gori. The incomplete dams had been greatly damaged by cattle in June and a large amount of reconstruction was necessary. In addition, there were two bad washaways owing to heavy rains on the first two days of December and the work was therefore unduly retarded and expensive, the total cost of completion amounting to £448.

Repairs to Lemek Dams.

Temporary repairs costing £20 had been done on the Lemek dams by a party of porters in May and June, 1918, but in revisiting the site in November, Mr. Watts found that the lowest dam had been badly trodden in and that the second dam had suffered similarly but to a less extent. These, together with some repairs to the upper dam, were attended to at a cost of £240, and Mr. Watts left Lemek on the 6th of January, 1919.

Mr. Watts' final report.

Before leaving Nairobi on March 18th, 1919, Mr. Watts submitted a final report on the work which had been accomplished on the improvement of the water supply in the Masai Reserve. The works included :—

1. Three dams in the Lemek Valley.
2. Two dams at Ngori Gori.
3. One dam at Barsheret.
4. One dam at Ndolele on the Pimpin River.
5. One dam at the River Weikel.
6. One dam at Ol Moiyo in Kamasian.
7. One dam on River Marmont.
8. The cleaning of a portion of the River Sankutiek and its tributaries.

Sufficient water had been stored for the supply of stock grazing on eight different areas of one hundred square miles each and therefore could support 40,000 head of cattle.

In every case, except at the Weikel, the water had extended the grazing available.

Mr. Hemsted's proposals.

In March, 1918, Mr. Hemsted reported that some [illegible] might soon be available for works in the Masai Reserve for the benefit of the tribe, and suggested that part of this sum might be expended in the conservation and distribution of water for livestock. He advocated the necessity of a preliminary survey of the area, which should be undertaken with the object of investigating the possibility of :—

(1) Providing troughs or stone pitched watering places at perennial springs.
(2) Opening up old springs which had been trampled in by cattle.
(3) Distributing water by means of pipe-lines from the large rivers.
(4) Constructing dams in places where water was entirely absent or to which it was impossible to conduct pipes.
(5) Sinking wells and pumping water into troughs by windmills.
(6) Constructing irrigating furrows.

He remarked that unusually dry conditions had prevailed during the time when Mr. Watts had been in the reserve, and considered that the annual cost of repairing washaways, which were bound to occur in some of the dams in wet seasons, would be so large, that it was inadvisable to undertake many works of this description. He preferred the preparation of a larger number of smaller watering places, where water could be conducted into drinking troughs from springs, which should be regularly cleaned and carefully fenced. Numerous springs existed, having a daily discharge of from ten to twenty thousand gallons, which would, if properly treated, suffice for the stock able to use the pasturage available in the vicinity.

* The dams at Weikel, Ol Moiyo in Kamasian and the Marmont River were all destroyed during the 1918 rains.

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312

In January, 1917, the Governor considered that it was necessary to take other measures for the supply of water to the unreserved districts of the Masai Reserve. Efforts had been made to institute a search for underground water by means of boring in the Rift Valley, but these had fallen through owing to lack of machinery. He, therefore, recommended to the Secretary of State the measures proposed by Mr. Hemsted, and received approval to his proposals in March.

In that month he approved the proposal to effect repairs to dams built by Mr. Watts, when and as repairs were required. The cost of such repairs was not expected to exceed a few hundred rupees annually.

On the 19th of December, 1917, the Director of Public Works, the Officer in Charge, and the Chief Veterinary Officer, met to consider the question of the improvement of water facilities in the Masai Reserve. The enormous areas of low-lying land extending down to altitudes greatly lower than those of some of the water-rushes springs and dams appeared to them to offer ready facilities for the distribution of a water supply by means of piping. The engineering operations involved in such distribution of water over many hundreds of square miles of country, which were unsuitable for stock during drought conditions, were of a simple nature, and a brief and inexpensive examination would result in the mapping out of one or two projects which would suffice for all requirements for the next year or two, while continuous travel by engineers would result in the gradual improvement of small supplies by very inexpensive works, such as lowering of springs and draining swamps. The general idea of the pipe-lines was to locate them lengthy, roughly at intervals of ten miles, and it appeared that the diversion of one system of water would probably suffice for a fairly studied area of some six hundred square miles. The cost of important piping was, however, considered at the time to be prohibitive, and it was decided that such an important undertaking should await a settlement of the question of the imposition of a cattle tax on the Masai.

Apart from this major scheme, the Committee drew attention to the possibilities of enlarging water holes deep or impermeable water holes, by means of ballock-driven pumps, such as that shown to be installed at Kedong. They also suggested that the afforestation of some of the higher areas of the reserve, not available or required for grazing purposes, would be called on to improve the yield of the neighbouring springs.

In January, 1918, the Acting Governor sanctioned the expenditure of £300 from the Masai Reserve Account, upon drainage of some swamps in the upper course of the Wakiel River. In dry weather the whole of the water of this river is lost in the extensive swamps and reedy stretches of the river bed, and it was with a view to conserving this water supply in dry periods that the work of drainage was to be undertaken. The Secretary of State conveyed his approval to this expenditure.

In September, 1918, the Director of Public Works drew attention to the extreme interest that would attend the operation of deep bores in the Rift Valley, where it forms a portion of the Masai Reserve. Having recently visited the Kedong water hole, some sixteen miles west of Naivasha railway station, with a view to investigating the possibilities of installing windmill-driven pumps at that place, he came to the conclusion that this water might be a re-emergence of the Kedong River. The region was crossed by numerous vertical fault planes which provided communication for running water to leave the surface and go underground. The Rift Valley tended to lower and lower elevations in a series of gigantic steps as one proceeded southwards, and diminishing the distance there existed a fall of enormous depth and of similar nature under conditions of the kind, which existed in the Rift Valley although it had no surface water, and although the bottom, and probably the bed, were impregnated with alkali. Mr. Bellenger then considered the possibility of a subterranean outlet from Lake Naivasha to be almost non-existent, and stated that it could be absolutely established within a period of twelve months, by an extension of the evaporation observations, which had for the past eight years been carried out at Naivasha. It was, he said, an interesting subject

for speculation as to whether the existence of the deposits at Lake Magadi might not be attributed to the emergence of underground flows from Lake Naivasha and other surface waters of the Rift Valley, which had become heavily charged with alkali, in a long and slow passage underground.

Enormous areas of the Masai Reserve, where theoretical considerations led him to believe that underground water existed, were practically useless on account of the absence of water, and he recommended that an attempt should be made to procure the services of one of the boring parties, who were being employed in connection with the military operations, to perform a series of bores which should be carried to a depth of at least two thousand feet, unless fresh water were encountered at shallower depths. The localities he suggested for these experiments in the first instance were in the [illegible] Valley and at [illegible], two marches south of that place, where there was plain evidence of the action of copious surface water in recent times.

It was, however, found to be impossible to obtain the services of the personnel of a Water Supply Corps, although correspondence to this end was undertaken, both with the military authorities and with the Union of South Africa.

The Director of Public Works' letter, which had been forwarded to the Colonial Office in October, 1916, was referred by the Secretary of State to Dr. Strahan, the Director of Geological Survey, who remarked that recent volcanic rocks, which formed the greater part of the region in which it was proposed to bore, were usually traversed by fissures and caves, and that the disappearance of streams might be due in part at least to their finding underground channels of this description. It seemed highly improbable that the future deposits of alkali at Lake Magadi would be appreciably affected by the proposed bore-holes. He agreed that the suggestion that the freshness of Lake Naivasha was due to a circulation arising from the existence of underground outflows was a possible one, but mentioned that no re-emergence of the water had been found and that there was no clue as to the direction taken by the supposed outflows. The chances of striking these in a bore-hole appeared to be remote. Having regard to the character of the region, he considered that the quality of the deep-seated water, which it was hoped to obtain by boring, would be doubtful. The Secretary of State was, therefore, of the opinion that the project should be further considered before any action was taken which would commit the Masai to expense in the matter.

The Commissioner of Mines, in the middle of 1917, placed such evidence as was available before Professor J. W. Gregory, who expressed himself deeply interested in the proposals and considered that the chances of success in bores placed at suitable positions in the Rift Valley to the south of Lake Naivasha, in the Kedong Valley and south of Mount Suswa were sufficiently good to justify the risk. Mr. Bowring therefore suggested to the Secretary of State that Professor Gregory should be asked if he could arrange to visit the Protectorate and make a short personal examination of the area in question. This has been arranged for, but Professor Gregory has not yet been able to absent himself from India for the purpose.

Section 11.—[illegible] OF THE MASAI RESERVE.

[illegible]

In dealing with the potentialities of the Masai Reserve, it is possible to treat separately the two branches into which the question is divisible, namely, the potentialities of the Masai people and those of their possessions; and it is necessary in either case to consider the characteristics and distribution of each such division in connection with statistics.

It is hoped, in time, as also the condition in the Masai Reserve as to render their cattle immune to East Coast fever, all steps are now being taken to establish a branch veterinary laboratory at Nanyuki where a more thorough investigation will be made into the characteristics and peculiarities of the diseases to which Masai cattle are subject.

One of the difficulties which will have to be met, after the requisite staff has been obtained, is, again, the conservatism of the Masai. They consider the stock they now possess to be better suited to conserve them any other, and they prefer to lose annually by disease by letting disease run its course rather than by passing annually through treatment & the application of veterinary science. It will require personal perseverance to secure the performance of a continuous treatment of cattle such as dipping, the Masai themselves being too lazy and loftier to perform the necessary work themselves in the matter, and no attempts at passive resistance in all the Masai past experience, can be expected of them. In spite of such difficulties, however, it is possible to hope for an improvement in the stock conditions of the reserve which will eventually enable not only certain industrial areas to be settled, but will also render the Masai reserve free of a danger to the stock industry of the Protectorate.

A great deal can still be done in improving the watering and grazing properties of the area. The reserve as on the whole is the reserve badly supplied with springs and rivers, but many of these are practically useless for watering large herds of cattle owing to their inaccessibility or to the unsatisfactory nature of the approaches to them. Streams frequently run down hill-sides to disappear into the ground within a few yards of the foot of the hills and small springs become so trampled that it is impossible for cattle to drink either. The general tendency, as the supply of water gradually decreases, of at times the spring becomes evident.

A peculiar feature of the Masai Reserve is that the large rivers flow within a few miles of each other, frequently through dense bush or forest country where there is no grass available for cattle and thirst-stations in time essentially impaired. The Uaso Nyiro, Uaso Nanuk, Ngarbol somewhat considerable streams that rise together on the Mau and flow through inaccessible practically parallel to each other until they eventually meet and flower for through a deep gorge. But the evident position of the reserve possesses its advantage: all the large rivers have their sources at a considerable altitude of one seven to nine thousand feet, and it would be an engineering feat of no great difficulty to subject water from these rivers into the low lying grazing areas at the foot of the hills, some two thousand feet below. This project has been much other discussion, and may be expected to consummate, in connection with other development schemes, when funds and staff are available. The dams which have incidentally arisen certain of the streams have not proved the success it was hoped, & they are liable to damage by floods and are consequently requiring labour and expenditure for repairs, but the possibilities of irrigation and irrigation seems to offer every prospect of a solution of the difficult problem of rendering the enormous grazing areas in the Lake Plains capable of being utilized at all times of the year to any as much stock as their acreage will bear. There is no doubt that when the water-works have been constructed any shortage of grazing for the amount of stock now in the reserve will have ceased to exist.

In a district south of these Guaso Nyiro Masai and shortage of water and grazing the Masai have maintained the best kind of cattle they possess in better condition to the conditions encountered in the reserve than any imported grade stock. In the matter also their conservatism comes into play, but it is probable that, in this case, their contention is supported by fact. A pure-bred bull was recently purchased for use with the Masai cows in an attempt to procure a better and more marketable kind of stock, but this animal died before sufficient evidence had been obtained to prove or disprove the Masai contentions, and the problem has still to be dealt with. The Masai cattle are undersized and to look, and possess a fair milking store or prospect of becoming of value to the outside market. The estimated stock in the Protectorate represented by a capital of 711,000 head of cattle, with an annual increase of about 80,000 head, is thus wasted, and the most

6: Thomson K-3 (1883-1884) 1887
FL12 Masai FL12
Wa-Kwafi

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184 between the married and the unmarried people, very little work being expected of the latter, and the sweetheart system being preserved. They all, however, occupy the same village,
262 and of course the young men cannot afford to live on meat,
184 though they always come in for the lion's share when any of it is going. When parties go off on war-raids, they also contrive to eat a bullock by way of getting up their courage.

578 They lead upon the whole a very miserable life, ever threatened with destruction by the Masai, who have swept
132- off several villages and all their cattle. The soil being the
134 very richest loam, brought down from the mountains and spread over a comparatively level plain to the south of the lake, it is capable of producing anything; only the extreme dryness of the air and the very small annual rainfall, confined to a couple of months, keeps it sterile and barren.
312 To ameliorate this unhappy condition of things the Wa-kwafi have developed a wonderfully ingenious system of irrigation by artificial canals of (for them) great magnitude. They construct dams across the deep channel of the Guaso Ngiriah and thus raise the level of the water to that of the plain, and then, by an intricate network of channels, they spread
262 the precious fluid over a large area, and raise their millet
241 and melons. These products form almost their sole food, eked out by what they are able to kill in the chase and by fish from the river, though when meat is scarce they are not
136 disdainful even of rats. Of these there were simply
123 myriads. They swarmed everywhere, and nothing was too sacred for them. Need it be wondered if "oft in the stilly night" were heard imprecations loud and deep upon the wretched pests whom I have been wakened up by my nose being bitten or the sanctity of my toe invaded. My books were devoured, and even the bullets in my cartridges were not too indigestible. Everything, indeed, had to be kept under iron or hung up under shots as represented on page 313.

157 As in the case of the Wa-taveta, the Wa-ndorobo are
123 singularly honest and reliable, so much so that valuable goods and equally valuable food are left in their charge with the utmost confidence, and I have heard of no case of this being violated. To me, one of the most remarkable features in the character of the young women and girls was their absolute unconsciousness of fear in my presence, and the complete confidence they seemed to have in me. They indeed took

7: Hailey G-4 (No date) 1950 FL12 Masai FL12

Mbugwe are Bantu. There is also a small group of Tindiga, leading virtually a bushman life in the Lake Eyasi basin, to whom reference was made in Section I.[1] There would appear to have been a movement both northward and southward on the part of the tribes, who were previously contained in a very small area by the Masai invasion of the early part of the century.

THE MASAI DISTRICT

The Masai District forms the southern portion of the large block of country in Tanganyika and Kenya, extending to no less than 21½ million acres in extent, occupied by the Masai tribe, whose numbers were given in the 1931 Census as 48,645 in Kenya and as 47,176 in the 1948 Census in Tanganyika. There will be found in the Chapter dealing with Kenya Colony further reference to the tribal characteristics of the Masai, and it will be sufficient to give here only those facts which bear in particular on the position they occupy in Tanganyika.[2]

The southern movement of this tribe from the neighbourhood of Lake Rudolf seems to have come to an end about the middle of last century, but its spearheads had in 1850 penetrated as far south as the Great Ruaha River and even to Ulanga in the Iringa District, whence they were driven back by the Gogo and Hehe. There were many isolated Masai raids after that time, but these were in the main carried out by Kenya Masai, whose incursions were directed towards the coastal areas on the east, and indeed took them on occasion as far as Mombasa. The Masai settled in Tanganyika do not seem to have attempted a further movement of any importance into the neighbouring areas of the Territory.

The Anglo-German Agreement of 1890 cut the Masai country into two parts, roughly equal in area, though the population remaining under the British jurisdiction was somewhat larger than that which fell under German rule. The result was to make an effective division between the Kenya and Tanganyika Masai, and though the two sections have retained a community of racial interest, this has not extended to the political field. Such political unity as the Masai people possessed had existed largely for war purposes, and in peace time political as apart from religious authority was dispersed among the headmen exercising control over the groups having a customary right of pasturage in particular localities. There was moreover lacking in the case of the Tanganyika Masai a motive which might have led them to identify themselves with the Kenya Masai, namely, the need for protecting their lands from alienation by Government for the benefit of Europeans. The troubles created in Kenya by the efforts of Europeans to secure possession of Masai lands[3] were not repeated in Tanganyika, where the Masai have remained undisturbed in the occupation of the country they held at the period when European rule was established.

The present Masai District comprises, in the north, the Loliondo area, the dominant feature of which is the vast Serengeti plain, with the extinct volcanoes which mark its southern end. In the centre, south of the Rift Wall, the plateau type of country is characterized by volcanic hill masses, which provide a number of permanent water sources. *In the South the countryside shows scrub steppes*, with a low and very variable rainfall.

Practically the whole of the area included in the District is used only for pastoral purposes. If tradition is correct in holding that the tribe was once

[1] See page 078.
[2] Page 788, Chapter II.
[3] See *An Administrative and Political History of the Masai Reserve*, C. R. Smallfield, 1919.

14:Orr & Gilks D-4 (no date) 1931 FL12 Masai FL12
Kikuyu FL10
Kenya FL1

Of the 15 edible earths analysed (Appendix I, Table V), 13 were definitely richer in sodium than ordinary Kenya soils. The sodium content of these 13 earths ranges from 0·24 to 30·15 per cent. Five of these samples were from the Masai Reserve, and four of them contain high percentages of sodium. The best of these with 30·15 per cent. would form a fair substitute for Magadi soda. In the samples from the Kikuyu Reserve, the highest sodium content is 0·35 per cent.

With regard to the other inorganic constituents, only one of the 13 samples was richer in phosphorus than ordinary Kenya soil. Five of the earths are definitely richer in calcium than soil, ranging from 0·77 to 2·56 per cent. as compared with 0·75 per cent. in soil. Two of these are from an area in the Kikuyu Reserve, and it is interesting to find that they are the most sought after. The source of supply of one of them, viz., Gitirikani earth, which has a calcium content of 1·26 per cent., was at one time in the Masai country. The Kikuyu were then in the habit of making raids and fighting for this salt. They state that their cattle were fatter, bred better, and were more resistant to disease when they had a supply of Gitirikani earth. Similarly in the Masai reserve, the most popular earth is said to be that from Ol Doeyorasha, and it has the highest calcium content.

The two edible earths which were not richer in sodium than ordinary soil contained large percentages of iron. These seem particularly popular with pregnant women. On the whole, it is probably true to say that popularity is associated with either a high content in calcium and sodium, or a high iron content.

In addition to plant ash and edible earths, the water from certain springs is held in high esteem, especially by the women, and is used in cooking. Analyses of 15 samples show a fairly high calcium content in some as compared with different waters in Britain (Appendix I, Table VIII), the highest figure being 43·60 parts per 100,000, and the average 9·83.

(iii) *Milk from the Masai Reserve.*

The analyses of 13 samples of milk from different herds of Masai cattle are averaged in the following table and compared with average figures for milk from cows at the Rowett Institute.

	Masai Milk. Per cent.	*Home Milk.* Per cent.
Total solids	13·77	12·89
Fat	5·48	3·9
Sugar	4·92	4·6
Nitrogen	·57	·54
Total ash	·73	·75
Ca	·139	·119
Na	·087	·056
K	·143	·168
P	·095	·110
Cl	·095	·111
Fe	·00118	·00118

[123] The map (Fig. 3)[A] shows the numbers of rivers that rise in the hills from the Kenya border to the northern edge of the Serengeti Plain. The Bologonja and several smaller springs are perennial, but most of these watercourses flow only during wet periods, or following occasional heavy rains during the dry periods (Fig. 18). At this time the catchment areas of the scattered hills are critically important.

[13] In the hills between the boundary of the Serengeti National Park and Lolionde, cutting, overbrowsing, and overgrazing by the Masai have seriously reduced the watershed values of the area. Runoff is torrential after rains, and virtually no dry season surface water is available through the area. There are several bore holes (Fig. 19) which have the effect of concentrating livestock and causing very severe overgrazing in the vicinity.

[14] Across the hills in the past destruction of the vegetation has been very much less, largely because it is an area infested by tsetse fly, so the Masai have not grazed it much. The vegetation provides fair watershed and even the scattered dry season storms produce some surface water.

[A] [See p. 19.--Ed.]

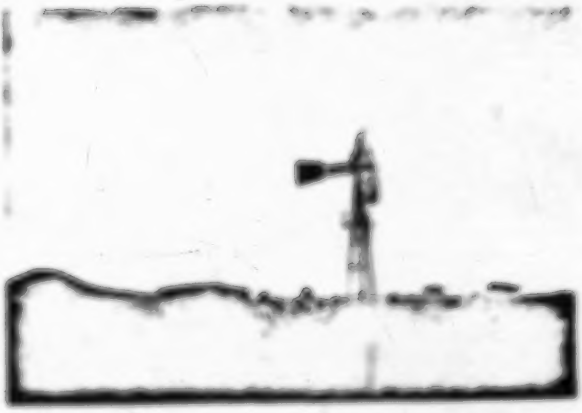

Figure 19.

Bore hole with windmill in northwestern Serengeti Plain. This was put in to provide dry season water for the Masai livestock. When the picture was taken (1958) the well was not in operation, consequently there was now grass cover remaining.

19: Talbot K-4,5 (1956-1962)1964 FL12 Masai FL12

• 312 In the open Serengeti Plain there are a few springs and wells. The high evaporation tends to concentrate any stored water in the plains region and as a result the water supplies are limited and they are mostly saline or alkaline. Pearsall (1957) has presented a series of tables showing the analysis of water samples from the water sources of the Serengeti region.

313 During the long rains low spots collect standing water throughout the plains of the study area (Fig. 88). Particularly on the eastern areas there is an impermeable hard pan near the surface (Fig. 15) and much precipitation remains on the surface in low spots until it evaporates or is drunk by the animals. The longer the water stands, the more saline or alkaline it becomes through evaporation.

[See p. 6A.--Analyst]

The Ngorongoro Highlands provide a large catchment area principally for the area to the south, outside of the study area. There are a few streams and springs on the north-western flanks of the mountains that are of importance for wildlife and domestic livestock.

Throughout the study area, wherever watersheds are accessible to the Masai they are damaged. In the north, through burning and overgrazing the watersheds of the Rau Escarpment and the Loita Plateau are being

19: Talbot E-4,5 (1956-1962)1964 FL12 Masai FL12

seriously damaged (Dowling, 1960; Talbot, 1960a). The same is true for the Ngorongoro Highlands (Pearsall, 1951; Pereira, 1960).

123 30 Summary: Permanent waters exist in Western Kenyaland in the form of a few rivers, springs, and wells. Seasonal water comes from standing rainwater in the open plains during the wet seasons, and pools of water in the bush country watercourses during the dry season. Waterholes on the Rift Escarpment, the Ngorongoro Highlands, Lolia Plateau and numerous small hills are of critical importance to provide nighttime water. Wherever they are accessible to Masai livestock the catchment areas are overgrazed, and markedly overburned.